UNITED STATES PATENT AND TRADEMARK OFFICE

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/529,711	03/29/2005	Jill MacDonald Boyce	PU030225	2040

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THOMSON LICENSING LLC
Two Independence Way
Suite 200
PRINCETON, NJ 08540

EXAMINER
AN, SHAWN S

ART UNIT	PAPER NUMBER
2621	

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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

PTOL-90A (Rev. 04/07)

	Application No.	Applicant(s)
Office Action Summary	10/529,711	BOYCE, JILL MACDONALD
	Examiner	Art Unit	
	Shawn S. An	2621	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE <u>3</u> MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.
- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
  Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on <u>05 July 2007</u>.

2a)☒ This action is **FINAL.**   2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) <u>1-14</u> is/are pending in the application.

    4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) <u>1,3-9,11,13 and 14</u> is/are rejected.

7)☒ Claim(s) <u>2,10 and 12</u> is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

    Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

    Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

    a)☐ All   b)☐ Some * c)☐ None of:

      1.☐ Certified copies of the priority documents have been received.

      2.☐ Certified copies of the priority documents have been received in Application No. _____.

      3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

    * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1)☒ Notice of References Cited (PTO-892)

2)☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)

3)☐ Information Disclosure Statement(s) (PTO/SB/08)
    Paper No(s)/Mail Date _____.

4)☐ Interview Summary (PTO-413)
    Paper No(s)/Mail Date. _____.

5)☐ Notice of Informal Patent Application

6)☐ Other: _____.
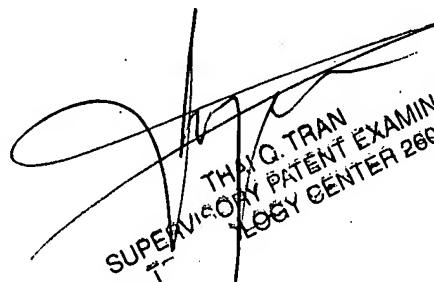
DETAILED ACTION

Reopen Prosecution

1.   In view of the appeal brief filed on 7/05/07, and the appeal conference with the supervisor, Mehrdad Dastouri, and the primary Examiner, Shawn An, PROSECUTION IS HEREBY REOPENED. New grounds of rejection are set forth below.

To avoid abandonment of the application, Appellant must exercise one of the following two options:

(1)   file a reply under 37 CFR 1.111 (if this Office action is non-final) or a reply under 37 CFR 1.113 (if this Office action is final); or

(2)   initiate a new appeal by filing a notice of appeal under 37 CFR 41.31 followed by an appeal brief under 37 CFR 41.37. The previously paid notice of appeal fee and appeal brief fee can be applied to the new appeal. If, however, the appeal fees set forth in 37 CFR 41.20 have been increased since they were previously paid, then Appellant must pay the difference between the increased fees and the amount previously paid.

A Supervisory Patent Examiner (SPE) has approved of reopening prosecution by signing below:

Response to Arguments

2.   Applicant's arguments with respect to appealed claims have been carefully considered, and after a thoughtful review, the last Office action has been hereby vacated. However, Applicant's arguments with respect to still pending appealed claims are moot in view of the following new ground(s) of rejection.

Claim Rejections - 35 USC § 103

3.   The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

4.   Claims 1, 3-9, 11, and 13 are rejected under 35 U.S.C. 103(a) as being unpatentable over Etoh (6,081,551) in view of Tanaka et al (4,663,665).

Regarding claim 1, Etoh discloses a video encoder (Fig. 1) for encoding video signal data for an image block and a plurality of reference picture indices, comprising

a reference weighting factor assignor (22a, 22b) responsive to the relative position between the image block (Input Image to 22a and 22b via 21a and 21b, respectively) and first and second reference pictures indicated by the plurality of reference picture indices (23, 24), wherein the reference picture weighting factor assignor determines respective implicit weighting factors for the first and second reference pictures (Fig. 5).

Etoh does not particularly disclose calculating respective implicit weighting factors for the first and second reference pictures based on respective distances of the image block to the first and second reference pictures.

However, Tanaka et al teaches TV system conversion apparatus comprising motion vector detecting method, wherein the method comprises calculating respective implicit weighting factors (Fig. 6d-6f) for the first and second reference pictures based

on respective distances (Fig. 6d, MV's in Horizontal and Vertical direction) of the image block to the first and second reference pictures for preventing a deterioration in picture quality, thereby obtaining an improvement of picture quality by utilizing the motion-compensated interpolated signal (col. 7, lines 5-66).

Therefore, it would have been considered obvious to a person of ordinary skill in the relevant art employing a method for encoding video signal data for an image block as taught by Etoh to incorporate Tanaka et al's teaching as above so as to calculate respective implicit weighting factors for the first and second reference pictures based on respective distances of the image block to the first and second reference pictures for preventing a deterioration in picture quality, thereby obtaining an improvement of picture quality by utilizing the motion-compensated interpolated signal.

Regarding claim 3, Etoh discloses a reference picture store (23, 24) in communication with the reference weighting factor assignor for providing a reference picture corresponding to each reference picture index.

Regarding claim 4, Etoh discloses a VLC (12) in communication with the reference weighting factor assignor for encoding the first and second reference picture indices.

Regarding claim 5, Etoh discloses a MC unit (22a, 22b) in communication with the reference weighting factor assignor for providing motion compensated reference pictures responsive to the reference weighting factor assignor.

Regarding claim 6, Etoh discloses a multiplier (Fig. 5, multiplying by 1/8) in signal communication with the MC unit and the reference weighting factor assignor for applying a weighting factor to a motion compensated reference picture (col. 8, lines 11-23).

Regarding claim 7, Etoh discloses prediction means (25) for forming first and second predictors (see switch selector, 27) from two different reference pictures.

Regarding claim 8, Etoh discloses two different reference pictures being both from the same direction relative to the image/picture block (Fig. 12).

Regarding claim 9, Etoh discloses a method for encoding video signal data for an image block, comprising:

receiving a substantially uncompressed image block (Fig. 1, Input Image);

determining implicit weighting factors (22a, 22b; Fig. 5) for the image block responsive to the relative positioning between the image block (Input Image to 22a and 22b via 21a and 21b, respectively) and first and second reference pictures indicated by the plurality of reference picture indices (23, 24);

computing motion vectors (21a, 21b) for the image block and each of the first and second reference pictures;

motion compensating (22a, 22b) each of the first and second reference pictures in correspondence with the respective motion vectors;

multiplying (Fig. 5, multiplying by 1/8) each of the motion compensated reference pictures by its calculated implicit weighting factor to form a weighted motion compensated reference picture (col. 8, lines 11-23);

combining each of the weighted motion compensated reference pictures into a combined weighted motion compensated reference picture (22a, 22b);

subtracting (10) the combined weighted motion compensated reference picture from the substantially uncompressed image block; and

encoding (5, 6) a signal indicative of the difference between the substantially uncompressed image block and the combined weighted motion compensated reference picture along with the corresponding indices of the first and second reference pictures.

Etoh does not particularly disclose calculating respective implicit weighting factors for the first and second reference pictures <u>based on respective distances of the image block to the first and second reference pictures</u>.

However, Tanaka et al teaches TV system conversion apparatus comprising motion vector detecting method, wherein the method comprises calculating respective implicit weighting factors (Fig. 6d-6f) for the first and second reference pictures based on respective distances (Fig. 6d, MV's in Horizontal and Vertical direction) of the image block to the first and second reference pictures for preventing a deterioration in picture quality, thereby obtaining an improvement of picture quality by utilizing the motion-compensated interpolated signal (col. 7, lines 5-66).

Therefore, it would have been considered obvious to a person of ordinary skill in the relevant art employing a method for encoding video signal data for an image block as taught by Etoh to incorporate Tanaka et al's teaching as above so as to calculate respective implicit weighting factors for the first and second reference pictures based on respective distances of the image block to the first and second reference pictures for preventing a deterioration in picture quality, thereby obtaining an improvement of picture quality by utilizing the motion-compensated interpolated signal.

Regarding claim 11, Etoh discloses determining MV for the retrieved reference pictures relative to the image block (21a, 21b).

Regarding claim 13, Etoh teaches the relative positioning of an ordinary frames and the plurality of template pictures/frames corresponds to the relative display times of the respective pictures/frames (Fig. 21).

Therefore, it would have been considered obvious to one of skill in the art to realize that the relative positioning of the image block and the plurality of reference pictures/frames corresponds to the relative display times of the respective pictures/frames to be in sync, so that there is no interruption in displaying the respective image block and the plurality of reference pictures/frames in proper order/sequence.

5.   Claim 14 is rejected under 35 U.S.C. 103(a) as being unpatentable over Etoh and Tanaka et al as applied to claim 9 above, and further in view of Bellers (6,782,054 B2).

Regarding claim 14, Etoh discloses testing within a search region for every displacement within a pre-determined offsets relative to the image block (Fig. 19a; col. 2, lines 18-48), and calculating SAD (26) of each pixel in the image block with a motion <u>estimated</u> reference picture.

Etoh does not particularly disclose <u>selecting the offset with the lowest SAD and mean squared error as the motion vector</u>.

However, Bellers teaches method and apparatus for MV estimation, wherein a block matching algorithm on the basis of regions or blocks for which a MV is being searched by comparing the pixel value contained in these blocks, and the evaluation is

accomplished by using an error function such as SAD or means squared error, and the vector yielding the smallest (lowest) error is selected as the best match providing the best motion vector (col. 2, lines 62-67; col. 3, lines 1-12).

Therefore, it would have been considered obvious to a person of ordinary skill in the relevant art employing a method for encoding video signal data for an image block as taught by Etoh to incorporate Bellers' teachings as above so as to select the offset with the lowest SAD and mean squared error as the (best) motion vector for providing an improved motion estimation.

Allowable Subject Matter

6.   Claims 2 and (10, 12) are objected to as being dependent upon rejected base claims 1 and 9, respectively, but would be allowable:

if claim 2 is rewritten in independent form including all of the limitations of the base claim 1 and any intervening claims; and

if either claim 10 or claim 12 is rewritten in independent form including all of the limitations of the base claim 9 and any intervening claims.

Dependent claims 2, 10, and 12 recite novel features, wherein the prior art of record fails to anticipate or make obvious the novel features.

Accordingly, if the amendments are made to the claims listed above, the application would be placed in condition for allowance.

Conclusion

7.   Applicant's amendment (as filed on 1/29/07) necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the

shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

8.   Any inquiry concerning this communication or earlier communications from the Examiner should be directed to *Shawn S An* whose telephone number is 571-272-7324.

9.   The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

10.   Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

SHAWN AN
PRIMARY EXAMINER

10/25/07